

The following Listing of the Claims replaces all prior Listings of the Claims within this application.

LISTING OF THE CLAIMS

Claims 1 – 25 (Cancelled)

Claim 26 (Currently amended) A method of fabricating a silicon-on-insulator (SOI) substrate having a uniform buried oxide layer, said method comprising:

forming a porous silicon-containing Si-containing region having a porosity of about 0.01% or greater in an upper portion of a Si-containing substrate;

forming a single crystal Si-containing layer directly on top of said porous [[silicon containing]] Si-containing region by epitaxial deposition;

forming an oxygen implant region by implanting oxygen atoms ions into at least the porous Si-containing region said wafer, wherein the a peak oxygen content peak is provided by the implanting of the oxygen ions, and is located within said porous silicon-containing Si-containing region or at an interface between said single crystal Si-containing layer and said porous silicon-containing Si-containing region; and

annealing said wafer using a thermal oxidation process at a temperature at which said implanted oxygen precipitates as oxides, wherein said precipitated oxides combine to form a uniform buried oxide layer extending across an entirety of a semiconductor-on-insulator (SOI) substrate wafer, wherein said porous silicon-containing region includes voids that are located beneath said uniform buried oxide layer after said annealing wherein after the annealing, portions of the porous Si-containing region located beneath said uniform buried oxide layer now contain voids, wherein a variation of thickness of said uniform buried oxide layer across said entirety of

said SOI wafer Si-containing substrate is less than 30% of a total thickness of said uniform buried oxide layer, and wherein a Si-containing over-layer is formed from a remaining portion of said single crystal Si-containing layer.

Claim 27 (Currently amended) The method of Claim 26, wherein some pores in said porous silicon containing Si-containing region are consumed during said thermal oxidation process and other pores in said porous silicon containing Si-containing region collapse into said voids beneath said uniform buried oxide layer during said annealing.

Claim 28 (Currently amended) The method of Claim 26, wherein said porous silicon-containing Si-containing region is formed by porous silicon electrolytic anodization of an exposed surface of said Si-containing substrate.

Claim 29 (Currently amended) The method of Claim 26, further comprising annealing said silicon-on-insulator (SOI) substrate structure in a hydrogen containing ambient after said thermal oxidation process, wherein a level of dopant atoms in said Si-containing over-layer is reduced during said annealing in said hydrogen containing ambient.

Claim 30 (Previously presented) The method of Claim 26, wherein an oxygen dose of about 1E17 atoms/cm² or less is employed during said implanting of said oxygen atoms, and wherein said uniform buried oxide layer has a thickness of about 100 nm or less.

Claim 31 (Currently amended) A method of fabricating a silicon-on-insulator (SOI) substrate

having a plurality of uniform buried oxide regions, said method comprising:

forming a porous silicon-containing Si-containing region having a porosity of about 0.01% or greater in an upper portion of a Si-containing substrate;

forming a single crystal Si-containing layer directly on top of said porous silicon containing Si-containing region by epitaxial deposition;

forming a plurality of patterned oxygen implant regions by implanting oxygen atoms ions into at least the porous Si-containing region said wafer, wherein the a peak oxygen content peak is provided by the implanting of the oxygen ions, and is located within said porous silicon containing Si-containing region or at an interface between said single crystal Si-containing layer and said porous silicon containing Si-containing region; and

annealing said wafer using a thermal oxidation process at a temperature at which said implanted oxygen precipitates as oxides, wherein said precipitated oxides combine to form a plurality of uniform buried oxide islands, in which a variation in thickness of the buried oxide islands across an entire width of the buried oxide islands is less than 30% of a total thickness of the buried oxide islands, regions, wherein said porous silicon containing region includes voids that are located beneath said uniform buried oxide layer after said annealing wherein after the annealing, portions of the porous Si-containing region located beneath said plurality of the buried oxide islands now contain voids, wherein a Si-containing over-layer is formed from a remaining portion of said single crystal Si-containing layer, and wherein said porous silicon containing Si-containing region abuts said single crystal Si-containing layer around said plurality of uniform the buried oxide islands regions.

Claim 32 (Currently amended) The method of Claim 31, wherein some pores in said porous

~~silicon containing Si-containing~~ region are consumed during said thermal oxidation process, and other pores in said ~~silicon containing~~ ~~Si-containing~~ region collapse into said voids beneath said plurality of uniform buried oxide regions during said annealing.

Claim 33 (Currently Amended) The method of Claim 31, wherein said porous ~~silicon containing~~ ~~Si-containing~~ region is formed by porous silicon electrolytic anodization of an exposed surface of said Si-containing substrate.

Claim 34 (Previously presented) The method of Claim 33, further comprising annealing said silicon-on-insulator structure in a hydrogen containing ambient after said thermal oxidation process, wherein a level of dopant atoms in said Si-containing over-layer is reduced during said annealing in said hydrogen containing ambient.

Claim 35 (Previously presented) The method of Claim 33, wherein an oxygen dose of about 1E17 atoms/cm² or less is employed during said implanting of said oxygen atoms, and wherein said uniform buried oxide layer has a thickness of about 100 nm or less.

Claim 36 (Currently amended) A method of fabricating a silicon-on-insulator (SOI) substrate having voids beneath at least one uniform buried oxide region, said method comprising:

forming a porous ~~silicon containing~~ ~~Si-containing~~ region having a porosity of about 0.01% or greater in an upper portion of a Si-containing substrate;

forming a single crystal Si-containing layer directly on top of said porous ~~silicon containing~~ ~~Si-containing~~ region by epitaxial deposition;

forming at least one oxygen implant region by implanting oxygen atoms ions into at least the porous Si-containing region said wafer, wherein the a peak oxygen content peak is provided by the implanting of the oxygen ions, and is within said porous silicon containing Si-containing region or at an interface between said single crystal Si-containing layer and said porous silicon containing Si-containing region; and

annealing said wafer using a thermal oxidation process at a temperature at which said implanted oxygen precipitates as oxides, wherein said precipitated oxides combine to form at least one a uniform buried oxide region during said annealing, wherein some pores in said porous silicon containing Si-containing region collapse into voids beneath said at least one the uniform buried oxide regions during said annealing, wherein said porous silicon containing region includes voids that are located beneath said uniform buried oxide layer after said annealing wherein after the annealing, portions of the porous Si-containing region located beneath said uniform buried oxide layer now contain voids, and wherein a Si-containing over-layer is formed from a remaining portion of said single crystal Si-containing layer to provide a semiconductor-on-insulator (SOI) substrate.

Claim 37 (Currently amended) The method of Claim 36, wherein pores in said porous silicon containing Si-containing region are consumed during said thermal oxidation process.

Claim 38 (Cancelled).

Claim 39 (Cancelled).

Claim 40 (Currently amended) The method of Claim 36 [[39]], wherein said porous silicon Si-containing [[containing]] region is formed by porous silicon electrolytic anodization of an exposed surface of said Si-containing substrate.

Claim 41 (Currently amended) The method of Claim 36, further comprising annealing said ~~silicon-on-insulator structure~~ semiconductor-on-insulator (SOI) substrate in a hydrogen containing ambient after said thermal oxidation process, wherein a level of dopant atoms in said Si-containing over-layer is reduced during said annealing in said hydrogen containing ambient.

Claim 42 (Previously presented) The method of Claim 36, wherein an oxygen dose of about 1E17 atoms/cm² or less is employed during said implanting of said oxygen atoms, and wherein said uniform buried oxide layer has a thickness of about 100 nm or less.